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Herd or Horde?

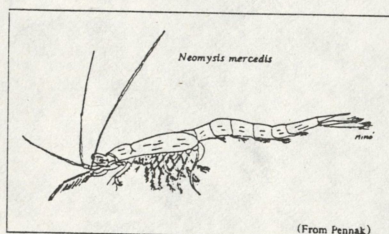
February 1991

CONNECTICUT
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(From Pennak)

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Editor's Note

Robert Paier, *Connecticut Environment's* editor since 1984, died January 10th, 1991. Bob was a 1965 graduate of Columbia University. He served as a linguist for the U.S. Army in Vietnam. In addition to his work in communications and public relations, Bob was the author of a novel, *The Pied Piper* (MacGraw-Hill). On page 22, colleague and friend Jim Murphy offers a tribute to the man you have met and known through this column and known through *Connecticut Environment*.

M.C.

Robert D. Paier
March 26, 1943 - January 10, 1991

Transition

TO: DEP staff
FROM: Leslie Carothers, Commissioner
SUBJ: **Transition!**
DATE: January 8, 1991

Yesterday, Governor Lowell P. Weicker appointed Timothy Keeney as the new Commissioner of the Department of Environmental Protection.

Mr. Keeney is a lawyer by training and is presently Director of the Office of Ocean and Coastal Resource Management of the National Oceanic and Atmospheric Administration. He has also served as a legislative analyst and counsel in the Senate where he worked on Senator Weicker's staff and for various important committees. His experience in managing ocean and coastal programs will be of great value in addressing the problems of Long Island Sound. And DEP will benefit from the fact that Mr. Keeney has Governor Weicker's full confidence. I know you will welcome him when he takes charge in late February.

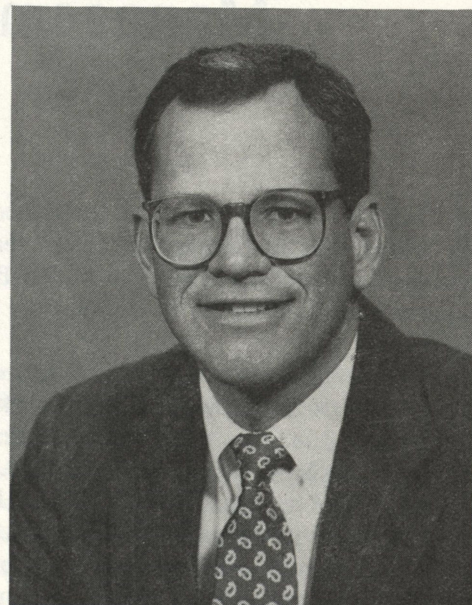
Naturally, I will miss being your Commissioner. My three and a half years at DEP have been the most challenging and rewarding period of my professional career. The time has passed quickly, but I think we have accomplished a great deal together — acquiring beautiful new lands, initiating statewide recycling, protecting endangered species, working to restore Long Island Sound, vigorously enforcing our laws, and reorganizing the Department — all this and more at a time when resources were extremely tight.

The main ingredient in DEP's success has always been its people. I don't think any state agency has a more committed staff or a stronger management team. (I have a collection of nice letters written to me about you in my left hand drawer. I read them on days when everyone seems to be mad at us!)

DEP has a special mission: the care and protection of Connecticut's landscape, its fisheries and wildlife, and the health and beauty of its environment for the benefit of *all* our citizens. And you have met those responsibilities faithfully and well. Although we will no longer be colleagues, I count many of you as friends. Wherever I go, I will always remember what we did together and the fun we had along the way.



We share with you, above, a transition memo from Environmental Commissioner Leslie Carothers, left. Incoming Commissioner Timothy R. E. Keeney, right, is a native of Somers. He's a 1970 graduate of the Wharton School of Finance and a 1976 graduate of the University of Connecticut Law School. Keeney was a Navy SEAL and holds the rank of Commander in the U.S. Naval Reserve.





Try your hand at counting the deer in this picture. Although these photos are not of Bluff Point, they illustrate an area "deep in deer." Wildlife experts suggested that 10 to 20 deer would be a desirable level at Bluff Point while a minimum estimate of deer on the reserve was 60. (Photos: Leonard Lee Rue III)

When's a Herd a Horde?

Management Meets Public Opinion

by **Patrick Spalluto**
Communications Officer

IN 1975, THERE WERE an estimated 20,000 white-tailed deer in Connecticut. Last year, in 1990, the number had grown to more than 34,000. By 1992 wildlife experts believe in excess of 40,000 deer will roam Connecticut.

The problems that arise when deer come into direct conflict with suburbia are obvious. Residents whose homes are located near wooded areas experience damage to flowers and shrubs when deer seek food. Also noticeable is the increase in reports of vehicles striking deer. Other signs are less visible but obvious to wildlife biologists.

Bluff Point Coastal Reserve in Groton is an 806-acre, state-owned parcel of land located on Connecticut's shore-

line. It was established as a "Coastal Reserve" in 1975 for the purpose of preserving the area's ecological balance. During the early 1980's, the Department of Environmental Protection's wildlife biologists observed and recorded that heavy vegetative damage and even bark stripping was taking place at Bluff Point. This, coupled with winter deer starvation reports in the mid-1980's, prompted the DEP to begin deer population surveys there in 1988. Using a helicopter to conduct aerial surveys during the winter when the landscape was defoliated, department biologists counted 59 deer in 1989 and 61 deer in 1990.

The ideal number, wildlife biologists say, is eight. Fifteen would be acceptable. Sixty deer were considered a

threat not only to the deer herd itself, but also to the ecological balance of Bluff Point. Because the deer population at Bluff Point was heavier than anywhere else in Connecticut and there was dramatic vegetative damage to the reserve, the situation demanded attention.

In Connecticut deer have no natural predators except man. Wolves and mountain lions once preyed upon deer in the state but are now eliminated. Large populations of deer which go unmanaged destroy the habitats of a range of smaller animals and birds, causing an ecological imbalance similar to what was occurring at Bluff Point. The answer, according to the DEP Wildlife Division, was to thin the herd.

In June of 1990 the DEP announced that a Bluff Point deer reduction effort was to take place in the fall. A shotgun hunt was to be held to reduce the number of deer to a level which no longer threatened the natural balance of Bluff Point. Fewer deer would also result in a healthier deer herd and a more productive ecosystem.

FOR TWO 9-DAY PERIODS in late November and early December, the reserve was to be closed to the public so the shotgun hunt could be conducted. The number of persons who would be permitted to participate in the Bluff Point hunt was 40, which equates to one hunter per 20 acres. This amount of hunting pressure has proved both safe and effective in moderating deer numbers on state lands in the past. Because of the extensive hunter safety program in Connecticut and the fact that only those chosen to hunt would be permitted access to the reserve, DEP officials were confident that public safety would not be endangered.

As news of the planned hunt spread, a small but vocal group who objected to the hunt began to mount opposition. The Friends of Animals, an animal rights group based in Norwalk, hired a consultant to assess Bluff Point's habitat.

In July, the Friends of Animals issued their report on their consultant's assessment of the deer herd. Their report stated that Bluff Point was a rich and diverse environment providing excellent habitat for a variety of animal species. It claimed that white-tailed deer had abundant resources to rely on. The report also accused the DEP of faulty methods of research and inventory.

THE FRIENDS OF ANIMALS stated that helicopter aerial counts were not an accurate measure of the number of deer there. It also said that the low birth rates of deer were an adaptation to the environment. The report summarized the state's three-year intensive study of Bluff Point as simply a means to justify a recreational hunt on the property. The report contested the DEP's findings and claimed that the carrying capacity of Bluff Point was greater than the state's wildlife biologists believed.

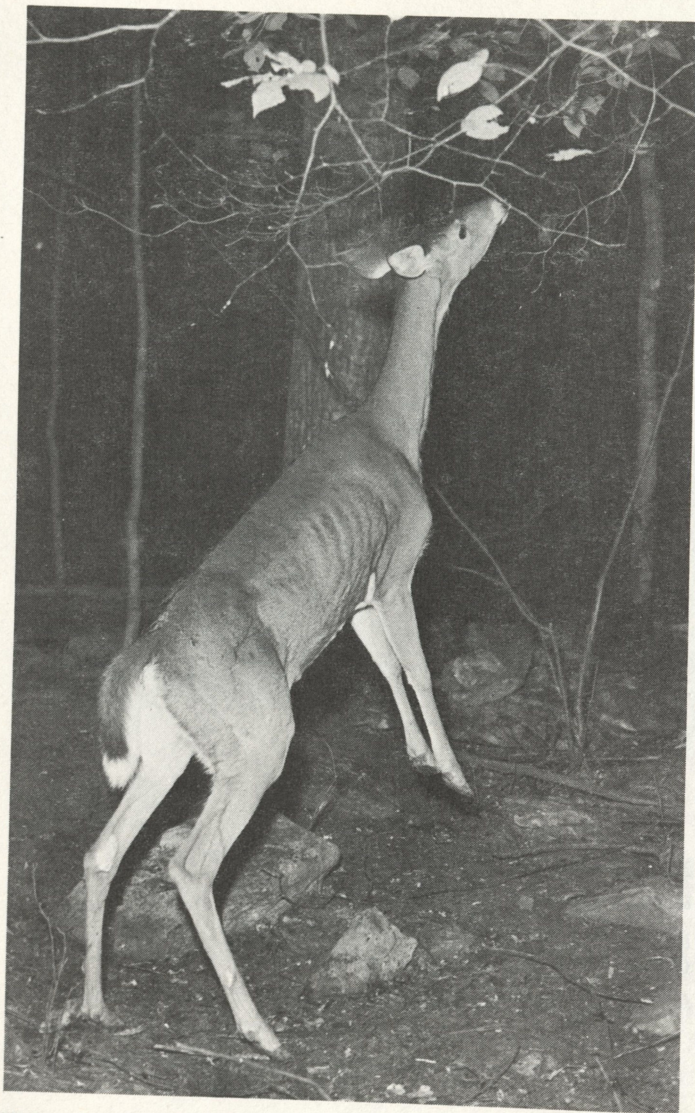
The Friends of Animals report also proposed that the DEP study non-lethal methods of population control,



Young white-tailed deer dead of starvation: according to DEP Wildlife Biologists, Bluff Point is the only area in Connecticut where deer starvation deaths have been reported.

specifically the use of fertility drugs. A deer hunt at Bluff Point at this time was premature, according to the Friends of Animals.

Mark Ellingwood, a wildlife biologist for the DEP who had been studying the situation at Bluff Point for several years, disagreed with the data presented in the Friends of Animals' report. In fact, a biologist who was cited as a literature reference in the Friends of Animals



When deer have eaten (browsed) all the vegetation available to them, a distinct "browse line" can be seen; it indicates that the local deer population has exceeded Biological Carrying Capacity.

report once described Bluff Point as a "woodland slum" and one of the most severely deer impacted areas he's ever seen, stated Ellingwood. Ellingwood also faulted the report's contention that food was abundant at Bluff Point because it was based on the premise that greenbrier (present at the reserve) was a preferred deer food.

While it is true that greenbrier is nutritious, it is also indestructible, claimed Ellingwood. The thorns that

greenbrier grow are an adaptation against animal browsing. It is also resistant to herbicides and mowing. To base the abundance of deer food on the fact that greenbrier was present was a false assumption, according to Ellingwood.

While claiming that aerial surveys of deer were imprecise, the Friends of Animals' report failed to inform the reader that this imprecision signified a conservative deer count (as indicated by literature citations used in Friends of Animals' report). The Friends of Animals' accusation that the DEP was only trying to substantiate a recreational hunt was false. The reasons for the hunt, plainly stated, were to reduce the deer population to restore the ecological balance and maintain the biological diversity of all species at Bluff Point.

Given the negative impacts that deer can have on plant and animal communities, the DEP believed it had a responsibility to permit hunting at Bluff Point. After considering the Friends of Animals' report, the DEP went ahead with its plan to reduce the Bluff Point deer herd, considering it in the best interest of the reserve's deer resource as well as its native plant and animal communities.

In October a meeting between the DEP and those opposing the hunt at Bluff Point was requested by two local legislators whose districts include the Bluff Point area: State Senator Steven Spellman of Groton and State Representative Lenny Winkler of Groton. DEP Deputy Commissioner Dennis DeCarli, DEP Wildlife Division staff, Friends of Animals representatives and local residents and park users who opposed the hunt met at the DEP offices to discuss the issue.

SENATOR SPELLMAN requested a one-year delay of the deer hunt in order to further review the situation. Information was presented by a consultant for Friends of Animals as well as by frequent users of the reserve. One of these, who said he frequently jogged in Bluff Point, said he never saw dead deer, only "fat and happy" deer. Along with the Friends of Animals consultant, these users claimed that there was not a particular need to manage the area.

Officials from the DEP reiterated their position that Bluff Point was being devastated by the overpopulation of deer. Although they did not immediately grant the anti-hunting faction the one year moratorium they requested, Deputy Commissioner Dennis DeCarli promised to investigate the potential of an anti-fertility drug for use on the deer. Deer sterilization was also proposed by those who opposed the hunt.

DeCarli contacted Dr. John Turner, a researcher involved in sterilization projects. Because sterilization had only been perfected in horses, had only been used on captive deer, and required two doses with annual booster shots, the opinion of Dr. Turner was that the drug had no potential for a free-ranging deer population and at this time his technique could not be applied to Bluff Point.

Having satisfied themselves that deer sterilization

was not a satisfactory alternative, the department no longer had a reason to delay the hunt. In early November, DEP Commissioner Leslie Carothers informed Senator Spellman and Representative Winkler that the DEP could not grant their request for a one-year delay. Commissioner Carothers emphasized that the DEP's responsibility is to protect *all* the ecological resources of Connecticut, including diverse and healthy habitats on state lands. The task of maintaining a balance between deer populations and the environment is difficult, considering the decline of all natural large predators except man. She also stressed that areas like Bluff Point would normally continue to be closed to hunting.

The Friends of Animals continued to oppose the hunt. Two attempts to block the hunt in court were unsuccessful. The hunt began on its scheduled date of November 19. On November 24, six days after it began, the hunt was ended.

Sixty-seven deer had been taken during the first six days of the scheduled 18-day hunt. Daily hunter success at Bluff Point averaged 57 percent. The average hunter success rate in Connecticut state forests is five percent per season. On the final day of the hunt, hunters reported seeing an average of 11 deer per hunter. According to a 1988 deer hunter survey, the daily sighting average statewide was 0.5 to 1.7 deer per hunter.

These numbers clearly indicated the overabundance of deer on this slightly more than one square mile area. Various tests performed by DEP wildlife biologists on the

deer taken during the hunt indicated that the herd was in poor health. Yearling antler beam measurements compared poorly with statewide results. The weights of the deer were notably lower than those from other herds. Depleted vegetation and lack of food would account for this poor health.

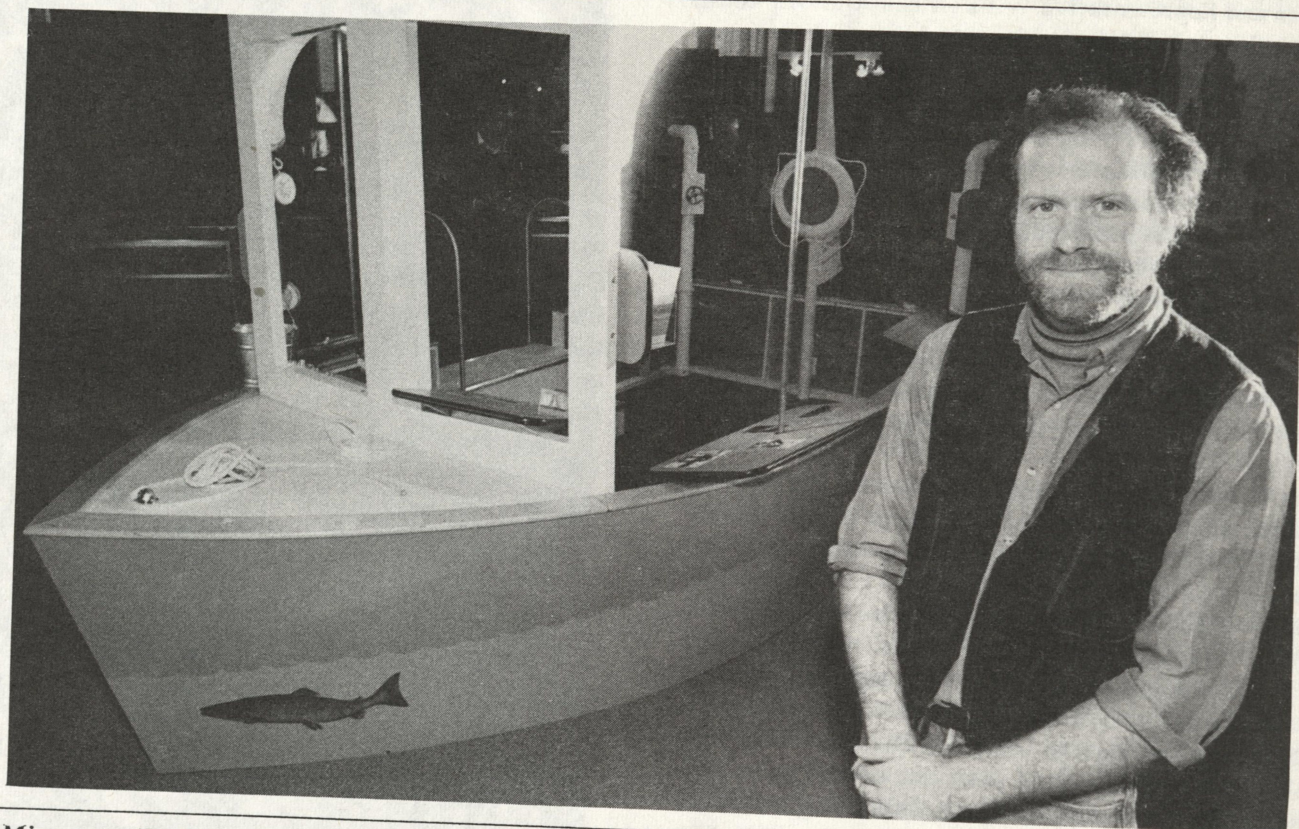
AFTER THE HUNT TOOK PLACE, the Friends of Animals and others who opposed the hunt criticized the DEP and claimed that the deer herd at Bluff Point had been exterminated. The day after the hunt officially ended, state conservation officers reported seeing 22 live deer. Coupled with the number of deer taken during the hunt, it is clear that DEP's original estimate of 60 deer at Bluff Point was conservative and that the pre-hunt figure likely exceeded 100.

Whatever the actual count was, it's quite clear that a very large population of deer once occupied an area which wildlife biologists say has the carrying capacity to ideally support eight. A lawsuit is pending in court challenging the legality of the Bluff Point deer reduction effort. Observations of many deer continue to be reported by nearby residents and those who use Bluff Point.

The DEP will continue to conduct aerial surveys of Bluff Point to determine the number of deer that remain. The forest will also be monitored to document recovery of the habitat as a result of the reduction of the deer population.



The white-tailed deer is the most abundant and best-known large herbivore in the Northeast. The species requires adequate food, water, cover and living space in order to ensure its healthy survival.



New Migratory Exhibit "Sound Connections" with designer Collin Harty. It was funded, in part, by DEP and the Alexander Host Foundation. (Photo: Charles Hisey; reprinted with permission of The Chronicle, Willimantic)

Make Some 'Sound Connections'

By James Stone, Membership Director, Mystic Marinelife Aquarium

MOST OF US HAVE BEEN TO Long Island Sound. Many of us know that environmental threats to the Sound have been the subject of serious study since 1985. We may not know, however, that even if we live hundreds of miles from the Sound our use of the earth can hurt this amazing ecosystem. One half of the land area in New England drains into the Sound. Throughout Connecticut, anything we dump onto the ground or into the sewer system may work its way into the Sound. If you live in this state you are a part of the Long Island Sound ecosystem.

A new "migratory" display, in the shape of a boat, that teaches us how to help preserve Long Island Sound is the newest traveling exhibit from The Connecticut State Museum of Natural History. It was created with funding from the Connecticut Department of Environmental Protection and the Alexander Host Foundation of Old Greenwich. Called "Sound Connections," the interactive exhibit will appear at Mystic Marinelife Aquarium during the entire month of March. Every weekend in April,

WFSB-TV, Channel 3, will be taking "Sound Connections" and other exhibits around Connecticut to promote environmental awareness.

The exhibit may be rented by libraries, nature centers or other organizations. Organizations can also arrange, through the Museum, for experts on the Sound to give lectures in conjunction with the display.

When you visit the exhibit, you can: pull up a core sample; test water depth and clarity; see images of important predators; steer the boat; or test your knowledge of facts about the Sound at the various stations on the boat. Some of the things you'll learn about:

Bottom Samples

Geological processes shaped Long Island Sound into a long, narrow, relatively shallow body of water. Geologists have learned much about how Long Island Sound was formed by studying the thickness and distribution of the rocks and sediments on its bottom. There are at least

three distinct layers: 1) bedrock, 2) glacial deposits, and 3) marine sediments.

Solid bedrock, the oldest layer, was formed hundreds of millions of years ago and underlies the entire state of Connecticut. Glacial deposits were left after the last glacier advanced to its maximum southern reach about 20,000 years ago. The effect was like a huge conveyor belt: as new ice came forward to replace that which had melted, loads of rock and soil carried by the glacier were dumped as heaps of debris called moraines, which now form Long Island.

As the glacier receded, a long, narrow basin formed between the newly deposited moraine and what is now the Connecticut coast. Ice melt from the glacier drained into this basin and formed a freshwater lake. The run-off carried with it a tremendous amount of sand, soil and gravel which was also deposited in the basin. If not for these glacial deposits Long Island Sound would be over 300 feet deep instead of its average 65 foot depth.

As the glaciers continued to melt, sea level rose, eventually causing salt water from the Atlantic Ocean to enter the basin and mix with the fresh water to form an estuary. The rising water slowly encircled the moraines, creating Long Island, Fishers Island, and Block Island, and giving shape to the Long Island Sound we recognize today.

ORGANIC MARINE DEPOSITS BEGAN TO FORM when the sea brought a flood of microscopic organisms that thrived in the new estuary. As they live their lives and die, the remains of these organisms settle to form a thin layer of organic deposits that accumulates on the bottom of Long Island Sound.

Rivers and the sea also carry water-borne sediments and organisms into the Sound and these too contribute to the accumulations on the bottom.

Water Clarity

Water clarity in the Sound is influenced by patterns of water movement. The shape and depth of Long Island Sound direct water movement. By examining the clarity of water at different places in the Sound, you can see how the shape of the Sound affects physical processes that move the water, such as river inflow, wave action, and tidal currents.

Long Island and Fishers Island form a natural breakwater that protects the Connecticut coast from the severe conditions of the open ocean. The Sound generally lacks large waves and is therefore considered a low-energy body of water. This allows fine particles to slowly settle out of the water. Long Island Sound is a natural trap for fine sediments and nutrients. Sediments make the water turbid (or unclear). Nutrients stimulate blooms of plankton which further cloud the Sound. The open waters of the central and western Sound are not as turbid as the water at the mouths of its major rivers.

Rivers bring the vast majority of sediments and nu-



Eli and Aaron Short of Storrs and brothers Kyle and Patrick Welz of Stafford Springs, left to right, learn about core samples of bedrock from under Long Island Sound.

trients into Long Island Sound. From the air, the Housatonic, Connecticut, and Thames Rivers, with their loads of muddy silt and clay, look like plumes of chocolate milk extending into the Sound. Most of these fine particles accumulate near the river mouths but considerable amounts drift into open waters where they settle out due to the Sound's low-energy conditions.

Waters in the eastern Sound are the least turbid due to the influx of clear ocean water.

The Food Chain

As tidal currents sweep over the bottom they pick up and redistribute more than seven million tons of sediment each day. These sediments, together with decaying matter and microscopic organisms, make up a constantly flowing source of nutrients that link all of the Sound's inhabitants and brew a rich soup of life.

Abundant nutrients, shallow water, and low-energy tidal mixing help support a thriving food chain. Animals eat plants and in turn are eaten by other animals. The food chain in the Sound is complex and interdependent. Marsh grass, growing along muddy shores where silt and clay particles have been deposited, depends on daily tidal flooding to bring it important nutrients that help it turn sunlight into food energy. At the end of each growing season, marsh grass breaks down and releases nutrients into the surrounding water for other plants and animals to use.

Zooplankton are tiny animals that live in the water and drift wherever tidal currents take them. They feed on other microscopic materials, such as microscopic plants (phytoplankton) and particles of decaying plant and animal matter that have been washed out of tidal marshes by the currents.

Fan worms and other creatures eat plankton. When threatened by a predator or faced with the abrupt changes of temperature or salinity that come with the changing

tide, fan worms withdraw into the protection of burrows in the muddy bottom. When feeding, the fan worm uses a feathery crown of tentacles to trap plankton and other tiny food particles being carried by the currents.

Winter flounder feed on sea worms and other marine animals. The young of winter flounder rely on the protected waters and abundant food available in tidal marshes. Adults live in deeper water and feed on sea worms, crustaceans, and small clams. This species changes color to blend in with the bottom sediments and avoid predators.

HUMANS MAY BE THE MOST DESTRUCTIVE predators in Long Island Sound. In a single year, humans take over 2.5 million pounds of flounder, 2.5 million pounds of lobster, and 1.5 million pounds of oysters from the Sound.

At the same time humans have filled valuable marshlands, dumped vast amounts of waste water into the Sound, and used toxic substances that disrupt the delicate balance of food chains.

Interconnections

The communities of plants and animals that live in Long Island Sound have developed over thousands of years in response to their environment. They must be able to cope with the conditions or perish. Many of the changes humans have imposed on the Sound are stressing the ecosystem. By dredging, filling and constructing jetties, we actually change the shape and depth of the Sound. By altering the shape, we change the water circulation patterns and thus the distribution of water-borne nutrients. Conditions are being pushed beyond the ability of many organisms to deal with them. For example, Connecticut has less than half the tidal marsh acreage it had in 1900.

Over five million people live within 15 miles of Long Island Sound. Because the Sound is downhill from much of New England, it is also affected by people living far inland. Tremendous amounts of sewage (most "treated" but some not) enter the Sound each day, overloading the system with nutrients which create "blooms" of algae that soon die and decay, robbing the water of essential oxygen. Run-off from agricultural, residential and commercial areas carry pesticides, fertilizers, petroleum products, heavy metals and other contaminants that wash into the Sound and can disrupt the balance of physical and biological conditions necessary for a healthy ecosystem.

Steering a Course

As members of the Long Island Sound ecosystem, we can push the system beyond its means, but then it will be we who are changed as much as the Sound. Every choice we make has a cost. Inadequate sewage treatment, for example, may result in beach closings and the loss of shellfish beds. Better sewage treatment may mean higher taxes. The choices we make determine the quality of life

we have in Connecticut.

WHAT WILL YOU DO? You make choices about the future of Long Island Sound not only in the voting booth but in everyday actions. The foods you choose to eat, the types of recreation you enjoy, how you care for your lawn or dispose of your waste: all these things can influence what happens in the Sound. With a clearer understanding of your role in the ecological balance of Long Island Sound, it is our hope you will have a greater insight into your impact on the system. For more specific information on ways you can help protect the ecology of Long Island Sound the Museum offers a leaflet, "A User's Guide To Long Island Sound."

For information about the exhibit, call the Museum (203) 486-4460.

Note: The exhibit, "Sound Connections," was designed and constructed by Exhibits Designer Collin Harty and planned by Maryon Attwood, Associate Director of The Connecticut State Museum of Natural History. Script writer for the Exhibit was James Stone of the Mystic Marinelife Aquarium. For their help with the exhibit, the Museum extends special thanks to: Hugo Thomas, James Murphy, Leslie & Ralph Lewis, George Wisker, Paul Stacy, Thaxter Tewksbury, Skip Crane, William & Virginia Welch, Rick Schreiner, Margaret Beauharnois, Julie Victoria, Roderick Macleod, Steven Fish, Sarah Wade, William J. Kelly, Sidney Quarrier, David Simpson, Donald Squires, Robert Whitlatch, H. Wes Pratt, Robert DeGoursey, Leslie Mehrhoff, Michael Bell, William Sacco, Steve Dunwell, the DEP's Coastal Resources Management Division and Natural Resources Center, and others. ■



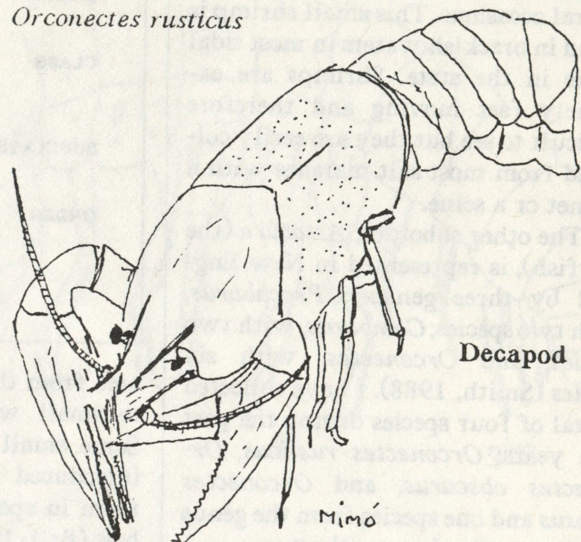
Celeste Welz of Stafford Springs helps son Kyle pull up a core sample of Long Island Sound bedrock while brother Patrick watches.

Malacostracans

Crustaceans of Connecticut's Fresh Waters

Text and illustrations
by **Alberto Mimo**
Senior Environmental Analyst

Orconectes rusticus



Decapod

SOUTHERNERS and Midwesterners may be more familiar than Connecticut residents with fresh water crustaceans like crayfish, but Connecticut is hardly devoid of these creatures. Though we may not be enjoying a lot of crayfish jumbalaya, local relatives of these creatures play a significant role in the aquatic food chain.

Although most malacostracans are marine species such as mantis shrimps, lobsters, and blue crabs, a small but significant group of fresh water malacostracans are found in lakes, rivers, and streams in Connecticut.

Malacostraca is a subclass of the class *Crustacea*, which is one of several classes in the phylum *Arthropoda* or "joint-legged" animals. Other important classes in this phylum are *Insecta* (insects), *Arachnida* (spiders), *Diplopoda* (millipedes), and *Chilopoda* (centipedes).

The subclass *Malacostraca* is subdivided into four major orders, *Mysidacea*, *Decapoda*, *Isopoda*, and *Amphipoda*.

The major difference among these four orders is that the mysids and decapods have stalked eyes and large shells or carapaces which cover most of the head and thorax while isopods and amphipods do not have the stalked eyes and do have a distinct head and

seven distinctive thoracic segments. Mysids have **biramous pareipods** (legs with two axes). Decapods do not. Isopods are ventrally compressed, or basically flat, while amphipods are laterally compressed, like shrimp.

Mysids

ONLY THREE SPECIES of mysids are found in North America. One species, *Mysis relicta*, is found in the Great Lakes region and some deep lakes in Eastern Canada. *Neomysis mercedis* is only found west of Oregon, and *Taphnomysis lou-*

siane is known from roadside ditches in Louisiana.

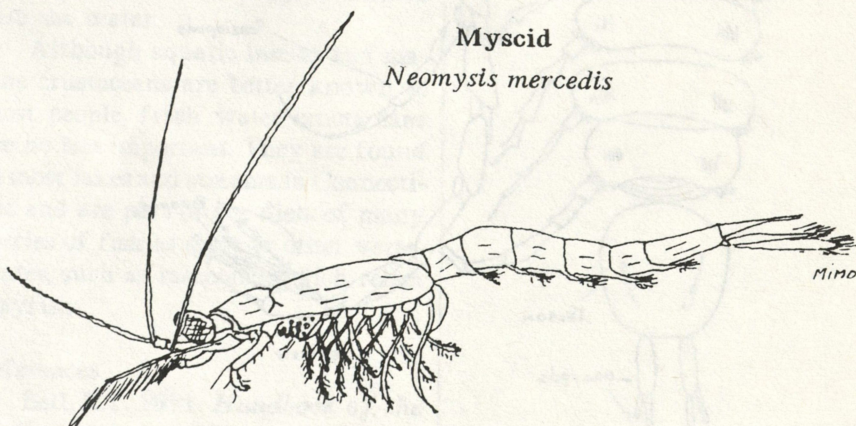
No mysids have been reported in Connecticut, but a better survey of some of the deep lakes in the western part of the state would be worthwhile.

Decapods

The order *Decapoda* comprises crayfish, lobsters, shrimp, and their relatives. Among fresh water decapods we find a small group of shrimps of the genus *Palaemonetes* belonging to the suborder *Caridea*, known also by the common name of grass shrimps.

Myscid

Neomysis mercedis

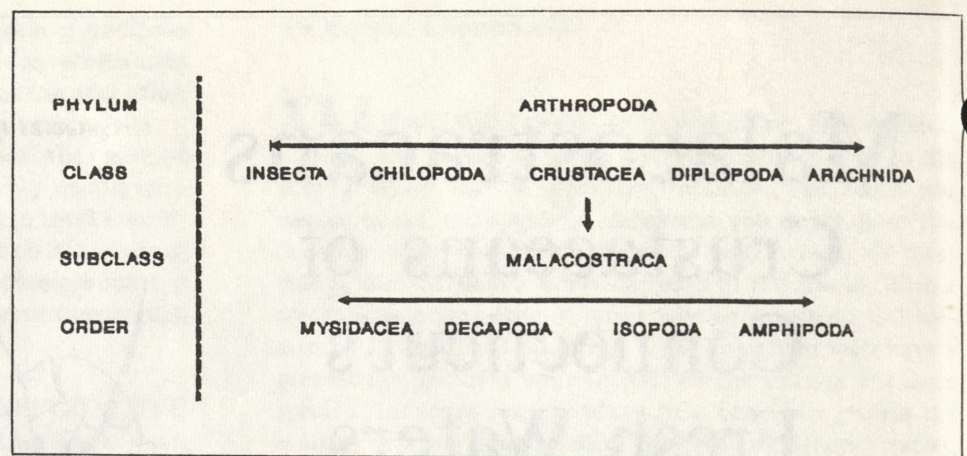


(From Pennak)

Several species are found in the United States. In Connecticut I have collected one species, *Palaemonetes pugio*, on several occasions. This small shrimp is found in brackish waters in most tidal rivers in the state. Shrimps are extremely fast moving and therefore difficult to see but they are easily collected from most salt marshes with a dip net or a seine.

The other suborder, *Astacura* (the crayfish), is represented in New England by three genera: *Procambarus*, with two species; *Cambarus*, with two species; and *Orconectes*, with six species (Smith, 1988). I have collected a total of four species during the past five years: *Orconectes rusticus*, *Orconectes obscurus*, and *Orconectes limosus* and one species from the genus *Cambarus*, *Cambarus robustus*.

In the south crayfish are abundant, with more than 100 species. The Connecticut valley has not been populated by southern species. Most crayfish in New England have reached this



area from the Great Lakes region due to small watershed drainage shifts. Some small populations are escapees introduced by fishermen who buy them in sport shops and use them as bait (Bell, 1971).

LOCAL CRAYFISH are secretive and nocturnal, living in shallow waters and foraging on the bottom. Crayfish coloration changes

with the environment and the local substrate. Camouflage is important for these animals. They feed mostly on plant materials and dead organisms. Although they are considered omnivorous, they rarely prey on other living organisms.

Connecticut crayfish species are not capable of traveling out of water, as they are all aquatic; however, crayfish are not good swimmers. They will walk on the bottom using their legs or "pleiopods." When attacked, they retreat at high speed using their back appendage, called a telson.

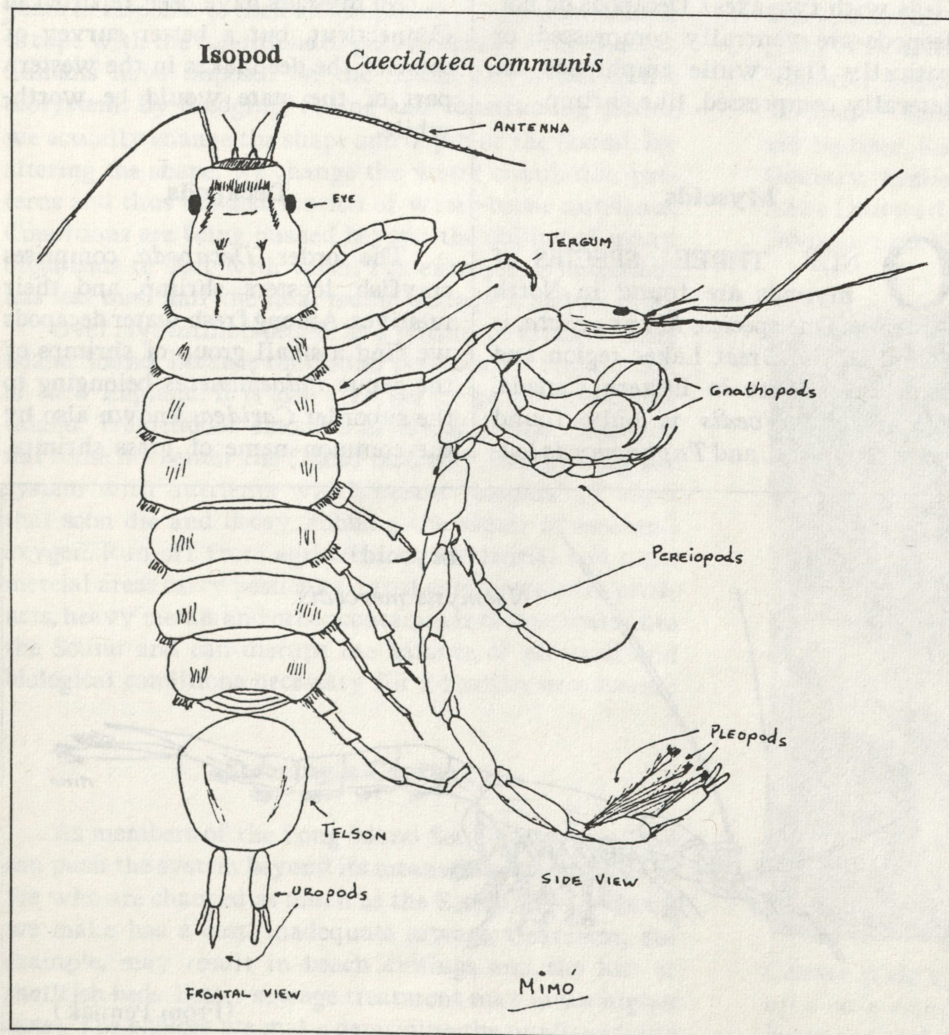
Crayfish mate in the spring and summer. Males and females will mate as many times as possible. Fertilization in the female can be delayed until conditions are appropriate. Female crayfish usually lay between 20 and 200 eggs.

Crayfish usually have a lifespan of no more than two years, though some crayfish in captivity have lived for as long as seven years.

Crayfish have been used to study the physiology of invertebrates. Several studies have also used them as indicator species for pollution. Most species of crayfish are not capable of surviving toxic pollution, such as heavy metals or pesticides, or low dissolved oxygen levels. They also do not do well in heavily silted sites.

Isopods

MOST ISOPODS are about one-half inch long and one-eighth of an inch long. Terrestrial isopods are well known as pillbugs, but aquatic isopods lack a common name. Isopods



are found in fresh water ponds and streams throughout Connecticut. There are only two species, *Caecidotea communis*, which is found almost everywhere in Connecticut, and *Caecidotea racovitzai*, found in just one locality in the Farmington River basin (Mimo, 1989).

Caecidotea isopods have been reported in any enriched waters, such as sewage treatment plant discharge areas and eutrophic lakes. They are also found in great numbers in ponds where there are large amounts of decaying leaves, twigs, and other submerged debris. Isopods are scavengers and detritivores.

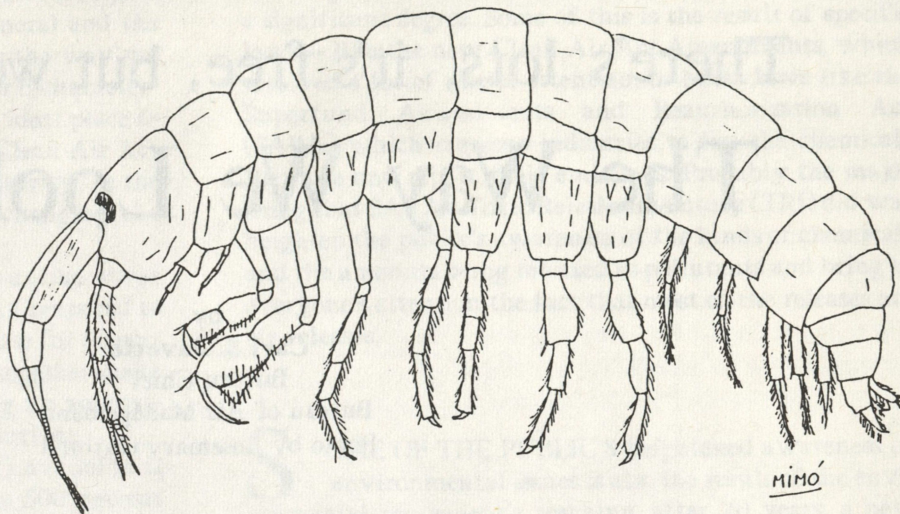
Isopods in Connecticut breed in the late spring or early summer and sometimes have a second brood in late summer. Males and females will mate more than once; sperm can be held in the female until conditions are favorable. The female then holds the fertilized eggs on a pouch under her back swimmerets, called a marsupial. Newly hatched isopods will stay on the pouch for one or two weeks and immediately swim for cover when they leave.

Amphipods

Amphipods, or scuds, are widely varied in size, from as small as 1/32 of an inch in length to as long as 1.5 to 2 inches.

Three families of amphipods are found in New England, *Hyalellidae*, *Crangonyctidae*, and *Gammaridae*. *Hyalellidae* comprises a single species, which is also found in South America, *Hyalella azteca*. *Gammaridae* comprises four species of amphipods, *Gammarus fasciatus*, *G. tigrinus*, *G. pseudolimnaeus*, and *G. deubeni*. Finally *Crangonyctidae* comprises six species: *Stygobromus tenuis*, *S. borealis*, *Synurella chamberlani*, *Crangonyx richmondensis*, *C. pseudogracialis*, and *C. aberrans* (Smith, 1988).

HERE IN CONNECTICUT I have collected five species, *Hyalella azteca*, *Crangonyx pseudogracialis*, *Crangonyx cracilis*, *Gammarus fasciatus*, and *Gammarus pseudolimnaeus*. Two additional Con-



Amphipod

Gammarus fasciatus

necticut species appear in Yale's Peabody Museum collection, *Crangonyx richmondensis*, and *Gammarus daiberi* (Eric A. Lazo-Wasem, 1990; personal communication).

These small crustaceans are active at night, when they eat almost anything they can get, plant or animal, including other amphipods on occasion. Amphipods appear in abundance in unpolluted waters. Some species prefer alkaline waters.

Amphipods mate in early summer and lay between 15 and 50 eggs. Eggs develop in a pouch on the abdomen of the female. Early stage amphipods seek cover as soon as they are released into the water.

Although aquatic insects and marine crustaceans are better known to most people, fresh water crustaceans are no less important. They are found in most lakes and streams in Connecticut and are part of the diets of many species of fish as well as other vertebrates, such as raccoons, which relish crayfish.

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There's lots, it's free, but we're changing The Way We Look at Air

by
Carl S. Pavetto
Bureau Chief
Bureau of Air Management
Photo by Rosemary Gutbrod



IT SEEMS THAT the way the public views air and air pollution is changing in a manner that is important both for environmental quality in general and the atmosphere specifically. What's changing is the way we view air as a repository for pollutants. Several characteristics of air have made it, unfortunately, an ideal place to dispose of pollutants. The recently enacted Clean Air Act Amendments of 1990 and a new age of "maturity" in the environmental movement, however, are changing the way we perceive our atmosphere.

As a place to dispose of pollutants, air is unlike water and land in a number of important respects. Compared to water and that segment of land which we use for disposal, there's a lot more of it. Water and land together make up the earth's surface, with water making up approximately 70 percent. Air covers that entire surface.

The volume of air (troposphere only) available is roughly 2,000 million cubic miles. This is 500 percent more than the volume of water.

AIR IS ALSO FREE. Water may be free in some cases, but land certainly isn't. Because air is free to users, it has provided us with a tremendous resource for disposal of pollutants and has taken more than its share of abuse.

Air is invisible. Generally, we can't see the air nor can we see the pollutants that become dispersed in it unless they reach concentrations that make them visible. Thus, we can't generally tell whether the air is clean or dirty just by looking.

To determine air quality, we rely on monitoring with instruments. The air monitoring instruments themselves are sophisticated and our ability to do comprehensive air monitoring is probably as well developed as modern technology will allow. However, when a pollutant is released into the atmosphere, air currents and turbulence tend to disperse the concentration rapidly, making monitoring a real challenge.

However, the technology of monitoring devices is continually improving. Monitors are able to detect and measure the pollutant in very minute quantities. Thus, air pollutant concentrations which would have gone undetected and unmeasured in the not-too-distant past can now be characterized and evaluated.

Two important things in particular are helping to change and shape the public's view.

First, the U.S. Congress passed, and the President signed on November 15, 1990, the Clean Air Act Amendments of 1990. These amendments follow the basic pattern of the predecessor Clean Air Act of 1977 in some respects (like letting the major responsibility for clean air reside with the states), make some innovations in other respects (like addressing acid rain for the first time) and were the first changes in federal clean air legislation in 13 years. By their nature and timing, the Clean Air Act Amendments are important.

Second, the public's awareness of environmental issues in general and air issues in particular is increasing to a significant degree. Some of this is the result of specific laws -- like the new Clean Air Act Amendments, which received a lot of media attention, or other laws like the Superfund Amendments and Reauthorization Act (SARA) which requires industries to list the chemicals they use and report their emissions. Probably the major thing that SARA's Toxic Release Inventory (TRI) did was heighten the public's awareness of the kinds of chemicals and the amounts being released as pollutants and bring to everyone's attention the fact that most of the releases are air releases.

SOME OF THE PUBLIC'S heightened awareness of environmental issues is also the result of the environmental movement's reaching, after 20 years, a new level of "maturity". Environment is no longer a "fad"; it is an issue that has attained "grass roots" awareness and support. In what could be called its "infancy and adolescence" period, our concern for the environment focused on *cleaning up* pollution. Now, we are looking more seriously than ever before at resource *conservation*, *preventing* (rather than cleaning up) pollution, the *cross-media* (air, water, land) effects of pollutants, and *new approaches to regulation* (like the market-based allowance trading system incorporated for acid rain controls in the Clean Air Act Amendments).

This increased awareness is also characterized by our realization of the regional and global nature of air pollution problems. We have begun new regulatory efforts that fit the scale of the problem. For example, ozone, or urban smog, will be dealt with partially through the establishment of the Northeast Regional Ozone Transport Commission. Connecticut will be a member of this multi-state commission which will deal with ground-level ozone as the regional problem that it is.

Programs dealing with global warming and stratospheric ozone depletion are in their infancy in terms of efforts to deal with these problems. However, not only do we now recognize the global nature of these problems, but this recognition has reached the real "grass roots" -- people from every walk of life... consumers, school children, the communications media, etc. Companies, too, are realizing this; many are even manifesting environmental concerns in marketing their products.

It seems that concern for environmental issues is on everyone's mind and it looks as though it will remain there. The Clean Air Act Amendments are important in their own right, but they may be only the harbinger of additional efforts from our legislators, industries and the general public to clean the air and protect our atmosphere from the harmful effects of pollution.

(For more information, call the Air Management Bureau at 566-4030.)

Campground Reservations

Applications for reservations at campgrounds in Connecticut State Parks and Forests for the Memorial Day through Labor Day camping season are now available from the Department of Environmental Protection.

Campsites at popular camping areas such as Hammonasset and Rocky Neck state parks fill up rapidly, and persons wanting to camp on the Memorial Day or July 4th weekends or during popular vacation weeks should reserve a site soon.

The state campground reservation application, along with the free pamphlet, "Camping in Connecticut," which lists campground areas, fees, season dates, camping regulations, and other general information, can be obtained by calling 566-2304 or writing to DEP, Bureau of Parks and Forests, 165 Capitol Avenue, Hartford, CT 06106. Reservation forms and flyers are also available from DEP Communications, at all campgrounds, and at major state parks.

Reservations may be made by mail only and must be for at least two nights but not more than 14 at inland areas and 21 at shoreline parks.

Unreserved campsites are offered on a first come, first served basis. No reservations are accepted for the period from April 19 to Memorial Day weekend or from Labor Day through September 30th, when campsites are also on a first come, first served basis at all campgrounds.

Parks and Rates

The parks for family camping and the rates per night are:

\$8.00 per night for: Devil's Hopyard State Park in East Haddam; Macedonia Brook State Park in Kent; Mashamoquet Brook State Park (Wolf Den Campground and Mashamoquet Brook

Campground) in Pomfret Center; Mount Misery area in Pachaug State Forest.

\$9.00 per night for: Black Rock State Park in Thomaston; Hopeville Pond State Park in Jewett City; Housatonic Meadows State Park in Cornwall Bridge; Kettletown State Park in Southbury; Lake Waramaug State Park in Kent; Taylor Brook Campground in Winchester (Burr Pond State Park); American Legion State Forest in Pleasant Valley; and the Green Falls area of Pachaug State Forest in Voluntown.

\$10.00 per night for: Hammonasset Beach State Park in Madison and Rocky Neck State Park in Niantic.

Districts Offer Seedlings

Seedling sale brochures are now available from Connecticut's Soil and Water Conservation Districts.

The districts offer a wide variety of tree, shrub, and ground cover seedlings suitable for conservation plantings. These include planting for reforestation, wildlife habitat, windbreaks, erosion control, and as Christmas trees. Several of the districts are also offering fruit tree seedlings, potted blueberry, rhododendron and mountain laurel plants, wildflower seeds, and fertilizer tablets. Orders are now being taken and distribution of seedlings is scheduled for April.

To obtain a brochure or further information, contact your local Soil and Water Conservation District Office:

Fairfield County, 744-6108
Hartford County, 688-7725
Litchfield County, 567-8288
New Haven County, 269-7509
New London County, 887-4163
Tolland County, 875-3881
Windham County, 774-0224

The Soil and Water Conservation Districts in Connecticut are non-profit agencies that provide technical assistance to farmers, private land owners, and local governments in cooperation with the USDA-Soil Conservation Service and Connecticut's Department of Environmental Protection.

Two Birds, One Stone at Dinosaur

March 2 "Bird Adaptations" slide show
1 p.m.

Slide show illustrating how birds are adapted for the foods they eat and their habitats followed by outside observation at Dinosaur Park's bird feeding station. Bring binoculars and field guides if possible.

March 9 "Bluebirds, Bring Them Back!"
1 p.m.

Film and guided nature walk focuses on the effort to reintroduce these colorful songbirds in Connecticut.

March 23 "Rockhound Riches"
10 a.m.

An introduction to the rock cycle, the properties of minerals, and how to start your own collection. Rock and mineral collections, videos, and discovery stations invite you to explore the rockhound world.

Every Saturday and Sunday in March

11 a.m. Film
12 noon Discussion of Fossil Tracks

2 p.m. Slide show
3 p.m. Film

Admission to all programs is free with exhibit center admission: \$2 or adults; \$1 for youths 6-17; free under six. ■

Long Island Sound Report Available

The Long Island Sound Study, a National Estuary Program project, has been studying the environmental threats to the Sound since 1985. Next year the Study will issue a Comprehensive Conservation and Management Plan containing recommendations for the cleanup of the Sound.

The study is focusing on five pollution areas: hypoxia, toxics, pathogens, floatables and their effects on living marine resources. Of the five, hypoxia poses the most serious threat to the Sound.

For this reason, the study released a Status Report and Interim Actions for Hypoxia Management in early January. The status report contains a number of interim actions designed to prevent the spread of hypoxia while the final management plan is being written.

Copies of the Status Report are available at the Connecticut Sea Grant Marine Advisory Program Office, 43 Marne St, Hamden, CT 06514; (203) 789-7865 or from DEP. Contact Sarah Wade at 165 Capitol Ave, Hartford, CT 06106; (203) 566-5524. Comments or questions about the report may be directed to either the Sea Grant Office or the DEP. ■

'Windows' Help Elderly

DEP's "Windows to Wildlife" Program is trying to give nursing home residents more opportunity to

enjoy the pleasures of observing Connecticut's wildlife.

The Wildlife Division's Nonharvested Wildlife Program is looking for public support for this project to improve backyard wildlife habitat at several Connecticut nursing homes. The more volunteers and materials that become available, the more nursing homes will benefit from this project.

"Windows to Wildlife" needs donations of bird seed, wildlife planting stock, or lumber for construction of nest boxes and bird feeders. Pre-constructed feeders and bird houses are also welcome.

Volunteers are needed to help install feeders and houses and to plant trees, shrubs, and flowers next spring.

This project is an ideal opportunity for scouts and 4-H or school groups to participate in community service. It is also appropriate for garden clubs, sportsmen's clubs, local conservation groups, and others who enjoy wildlife.

Donations to the program are tax deductible. Interested individuals or groups should contact DEP's Nonharvested Wildlife Program, Sessions Woods Wildlife Management Area, P.O. Box 1238, Burlington, CT 06013; 584-9830. ■

Folk Arts Coordinator Hired

Rebecca Joseph, Ph.D., National Endowment on the Arts Folk Arts Fellow and applied anthropologist, was recently hired by the Institute for Community Research, in Hartford, as the coordinator of its state folk arts program.

In April 1990 the National Endowment on the Arts awarded the Institute for Community Research a grant for staffing the folk arts program in Connecticut. Home to 126 different ethnic groups and nationalities, Connecticut has until now been one of

only four states without a statewide folk arts program.

Joseph will work with state and regional folk arts advisory committees to identify and promote increased visibility for folk artists; build a data base on the state's folk arts; and support folk arts activities and festivals throughout the state.

The Institute for Community Research is an independent, non-profit applied research and development institute working closely with the Connecticut Commission on the Arts, the Connecticut Humanities Council, and community agencies to foster support for community-based arts in the state.

The state folk arts program at the institute is supported by an advisory committee of folk artists, folklorists, and supporters of community arts from around the state. For more information, call 278-2044. ■

Beginners Fly Fishing

The Connecticut Fly Fishermen's Association offers a five session fly fishing school for beginners. The three evening classes begin March 1st. They are followed by sessions on a private pond and on the Willimantic river.

Tuition is \$30 for CFFA members; \$40 for non-members; \$20 for those 16 and under. For information contact: Dale Matthews at 875-2033. ■

Solar Home Tour

On Saturday, March 2nd, PACE (People's Action for Clean Energy) will hold its 15th Annual Solar Home and Alternate Energy Tour from noon to 5 p.m. This year's tour takes place in the beautiful countryside northwest of New Haven. Tickets are \$12 per person. Send checks to: PACE, 171 Huckleberry Hill Road, Avon, CT 06001; or call 693-4813 for further information. ■

Obscure But Interesting Titles

by Alan Levere
Senior Environmental Analyst

Buried deep in the files and hidden in the inventories are some publications that, though they are only occasionally requested, still continue to be of great interest. Of the scores of them, this month three of them make it into the limelight.

These publications focus on three different subjects and were put into print in 1978, 1979, and 1961 respectively.

Not Too Obscure: *Guide to the Mesozoic Redbeds of Central Connecticut.* Though you probably need to be either a little bit of a geologist or need a small dictionary of geologic terms, with this one you will find yourself in the realm of something you just don't learn about every day.

Our Central Valley in Connecticut formed after the continents had collided and then ever so slowly began to drift apart. The result of the slow separation left a large fissure or crack (the Central Valley) that slowly deepened as the land pulled apart. This slowly opening valley filled with many layers of sediments and lava way back in Mesozoic times between 250 and 65 million years ago.

The guide book provides a diverse view of the filling of the Central Valley through a series of seven field stops. Each of the seven stops depicts and describes different geologic processes that filled the valley during those years. These include the formation of sandstone, conglomerate and mudstone that are the final results of deposits left by rivers, alluvial fans and lakes. (At different times the val-

ley was home to the bed of a river, the mouth of a river, and the bottom of a lake.)

It might be a challenge, but this guidebook will paint you a picture of the landscape building that took place over millions of years in our state. Spiral Bound, 129 pages, dozens of photographs, maps and charts. \$5.00.

Fairly Obscure: Back in my early days one of the titles that jumped out at me in a review of our publications was *An Exploited Population of Muskrats with Unusual Biomass, Productivity, and Body Size.* It really is a study about muskrats of the Quinnipiac Marsh in the 1970's. I think the cover picture of open water grading into shallow marsh must have caught my eye.

This could be my favorite obscurity because there is so much information packed into it. For instance, the 16 pages include a map and a history of the marsh, eight photographs, reviews of six different predators, the study methods, and the results. The photographs include a muskrat, a lodge, some of the land use that borders the marsh, and an aerial photo of the marsh showing several dozen lodges.

It tells the story of the populations and dynamics of these animals, especially when in their preferred habitat: the cattail marsh.

If you have an interest in wetland ecology, the part that muskrats play comes to light here. \$2.00.

Truly Obscure: *Geological and*

Economic Aspects of Beach Erosion Along the Connecticut Coast. As it states in the abstract, "...research on two artificial beaches and one natural beach in the Westport-Norwalk area has revealed the striking fact that waves are adding sand to the natural beach but are rapidly eroding sand from the artificial beaches."

The publication explains the causes of this as the difference in the profile of the beach shoreline and the supply or lack of supply of updrift sand that would move in, or be removed, by longshore drift.

The general geologic conditions that affect Connecticut beaches are discussed as well as the rate of sand loss due to the erosive forces. Many of the terms that apply to this study are defined in the text. Despite the date of the publication a great deal of the information holds true today and as a result it continues to be a valuable resource. 14 pages, \$2.00.

Although it is frequently only by chance that some of these documents come to the forefront, they nonetheless are sometimes just the thing as valuable references. This is their month to shine.

To order, please include eight percent state sales tax and \$2.00 for handling per order (not per item). Our address is: DEP-NRC, Map Sales, Room 555, 165 Capitol Avenue, Hartford, CT 06106.

State Parks Get New Director

by
Roland Charest



(Photo: Rosalyn Gutbrod)

The score, as of today is: Connecticut, 2; Massachusetts, 0. First, The University of Connecticut got Jim Calhoun from the Bay State. Now we have Bob Freedman, new director of DEP's Division of State Parks.

No way does Freedman expect to cause the success shocks Calhoun does. But, in his way, Freedman, in coming years, will prove another Bay State loss to be Connecticut's gain.

Freedman, 51, assumed his new duties last December 14th. He comes from the Massachusetts Division of Forests and Parks. Over the years he directed the Heritage State Park Program and the Boston Harbor Island State Park.

"The Heritage program, now in its sixth year, restored old factories. We combined economic growth and historic preservation," says Freedman.

Already three such programs are in the planning stages here ... in Willimantic, Windsor Locks, and New London.

Freedman, a Boston native, graduated from Brookline High School in 1957. He got a Bachelor's degree from the University of Massachusetts (1962) and a Master's degree from New York University (1967).

In between the two degrees, he served four years in the Air Force, advancing to First Lieutenant and serving as a recreation services officer.

"I was torn between recreation and athletics -- directing a parks system or being an athletic director," Freedman says. "I made the right choice. I think Connecticut is a lovely state, and I'm looking forward to my principle mission: protecting the land and making sure the people of Connecticut have fun in their state parks."

Freedman, who is divorced, has two daughters, Ellen Jane, a Boston ad agency employee, and Heidi Lee, a student at Northeastern University.

On his time off, Freedman likes mountain climbing, cross-country skiing, and canoeing. When he has to stay indoors, he enjoys bird-carving.

His Connecticut task in coming years? He says: "Damaging of the environment hasn't stopped. We have to repair the damage and improve what we have."

Chatting with Bob Freedman is a pleasure. He has a sense of humor. He listens intently. He asks questions. He praises. He pauses.

Freedman, in summary, is direct, relaxing, enjoyable.

Just like a walk in the park. ■

Letters to the Editor

I enjoyed your December article by Julie Linden focusing on the value of the "urban forest". Hats off to the towns who have become seriously involved; let's hope others follow suit.

I must, however, point out an important oversight. Your cover illustration unknowingly promotes the single most damaging myth concerning trees (there are plenty). The notion that a tree's root system is a kind of mirror image of the above-ground branching structure is somewhat incorrect. In reality, the vast majority of feeder roots form a shallow disc within the top 12

inches of soil extending away from the trunk and covering two to four times the area covered by the crown.

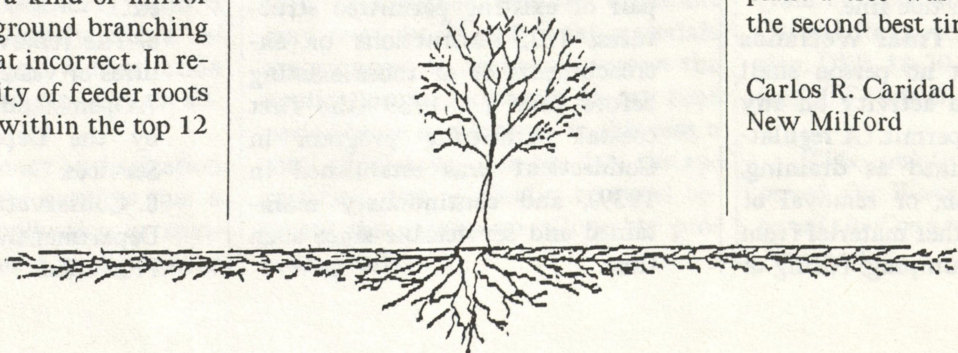
The implications of grading soil away from or onto the root system, trenching nearby, or even compaction due to foot traffic become clear given this more accurate portrayal of a tree's

root system. The most commonly overlooked physical causes of tree decline and death are soil and root related.

The overall condition of our "urban" trees, particularly in small towns, continues a largely unnoticed downward spiral. I'm looking forward to more articles addressing the issue.

---Remember, the best time to plant a tree was twenty years ago.... the second best time is now.

Carlos R. Caridad
New Milford ■



New Certificate Speeds Up Some Coastal Permits

by

Laurie Reynolds Rardin, Communications Officer
Coastal Resources Management Division

Many of you are familiar with the permitting programs administered by the Coastal Resources Management Division (CRMD) of the Connecticut Department of Environmental Protection's Water Management Bureau. But if you thought you knew it all, the program has a new twist. The **Certificate of Permission** may not be the complete solution to a coastal permit backlog, but it will allow proposals for specific categories of minor activities to be channelled into a shorter processing system with a timetable mandated by law.

As you may know, since its creation as part of a DEP reorganization in July 1988, the Coastal Resources Management Division has had ongoing statutory responsibility to administer the tidal wetlands and the structures, dredging and fill regulatory programs in conjunction with the policies and standards contained in the Connecticut Coastal Management Act.

As stated in the **Structures, Dredging and Fill Statutes**, a permit must be obtained by anyone who undertakes dredging, erects a structure or places any fill, obstruction or encroachment, or carries out work incidental to the above, in the tidal, coastal or navigable waters of the state, waterward of the high tide line.

Similarly, **The Tidal Wetlands Act** stipulates that no person shall conduct a regulated activity on any wetland without a permit. (A regulated activity is defined as draining, dredging, excavation, or removal of vegetation, soil or other material from a wetland, or the dumping, filling or

depositing of any material into a wetland. The erection of structures, driving of pilings, or placement of obstructions also requires a permit.)

Over the years, because of a variety of factors, including staffing shortages and insufficient funding, the time required for an applicant to receive a permit has become prohibitively long.

To address this problem, the CRMD advocated establishing an abbreviated permitting process for specific categories of minor activities regulated by the Structures, Dredging and Fill Statutes. Effective October 1, 1990, amendments to the Structures, Dredging and Fill Statutes passed in the 1990 legislative session establish a Certificate of Permission (COP) process designed to lighten the permit backlog by expediting applications for specific categories of minor activities.

The 1990 amendments, catalogued in PA 90-111, "An Act Concerning Structures and Dredging," set forth the Certificate of Permission process and describe the types of activities for which a COP is applicable. An application for a certificate of permission may be made for any of the following:

1. Substantial maintenance or repair of existing permitted structures, fill, obstructions or encroachments or of those existing before June 24, 1939 (the first coastal permitting program in Connecticut was established in 1939), and continuously maintained and serviceable since such time.

Substantial maintenance is defined as: "rebuilding, reconstructing, or reestablishing to a preexisting condition and dimension any structure, fill, obstruction or encroachment, including maintenance dredging." (See Public Act 90-111, section 1.)

Examples of such activities include: the repair or replacement of deteriorated seawalls, reconstruction of piers and repairing degraded timber bulkheads including pilings, whalers and deadmen.

2. Maintenance dredging of areas which have been dredged in accordance with a state permit and have been continuously maintained and serviceable.

3. Activities allowed under a perimeter permit and requiring authorization by the Commissioner of Environmental Protection. A perimeter permit, as defined in the Structures and Dredging Statutes, is a permit establishing boundaries waterward of the high tide line within which a recreational marina may reconfigure the layout of in-water slips, docks and moorings. (See Public Act 90-111, section 1.)

4. Temporary placement or reconfiguration of floating docks for the purpose of display or exhibition not authorized by a perimeter permit.

5. Minor alterations or amendments to permitted activities consistent with the original permit or to activities completed prior to June 24, 1939. Examples include: changing the material composition of a float (e.g., from styrofoam to concrete) and rearranging piles or modifying construction methods during the construction period (e.g., due to the presence of ledge, etc.).

6. The removal of derelict structures or vessels.

7. Open Marsh Water Management by the Department of Health Services.

8. Conservation activities of the Department of Environmental Protection.

Public Act 90-111 specifically exempts from regulation routine maintenance of existing permitted structures, fill, obstructions or encroachments as well as those which were built prior to June 24, 1939 and have been continuously maintained and serviceable since that date.

Routine maintenance is defined as the replacement and repair of out-of-water structures including the surfaces of docks, piers, wharves and bridges, replacement or repair in any year of up to 25 percent of pilings approved in accordance with CGS 22a-361, and seasonal installation, reinstallation or repair of floating docks, provided that all locations, dimensions, elevations and materials shall remain the same as or equivalent to that approved in the original permit issued in accordance with CGS 22a-361.

It is important to note that, with the exception of conservation activities of the Department of Environmental Protection or Open Marsh Water Management by the Department of Health Services, *activities which fall within the bounds of tidal wetlands are not eligible for a certificate of permission.*

In addition to provisions for the certificate of permission, PA 90-111 also provides for emergency authorizations for work on structures, fill, obstructions or encroachments for: 1) situations which may result in immediate, unforeseen and unacceptable hazards to life, health or welfare or significant loss of property if corrective action, otherwise requiring a permit or certificate, is not undertaken; or 2) damage caused by an act of nature or by a casualty loss for which repair or reconstruction is necessary in order to avoid economic damage to ongoing commercial activities — if the commissioner is notified within 15 days of the causative event of the casualty loss. The commissioner is required by statute to expeditiously rule on requests for emergency authorization and establish the duration of such authorization.

Once the emergency authorization expires, the new law requires that a complete permit application or complete application for a certificate of



A number of minor activities under the Structures, Dredging, and Fill Statutes will be expedited by the new Certificate of Permission process. (CRMD file photo)

permission must be submitted. If an application is not submitted within 30 days after the expiration of the emergency authorization, any completed work will be deemed a violation and be subject to all enforcement authorities of the commissioner.

If you are planning an activity waterward of the high tide line which you believe might qualify for a certificate of permission, call or write the Coastal Resources Management Division to receive a certificate of permission application package. The package includes specific, step-by-step instructions for filling out the application form and specifies the necessary documentation needed to successfully support the application.

Applications for certificates of permission are to be evaluated within 45 days from the date the application is received and must include a \$200 non-refundable application fee. If an application is incomplete, all materials will be returned and the applicant may re-apply. If additional materials are required to accurately assess the application, an additional 45-day time period becomes effective. In this case, a total of 90 days from the date the application was originally received becomes the maximum allowable processing time.

Once all COP materials are received, the commissioner shall determine the eligibility of the proposed work. By adhering to the timetable mandated in PA 90-111, the process will shorten the length of time needed to process those proposals which qualify.

The challenge of managing Connecticut's coast is not an easy one. Striking the balance between development of the shoreline and protection of our fragile coastal resources requires a careful blend of regulation, education, planning and public support.

The certificate of permission process was developed to serve as a time-saver for both applicant and regulator while maintaining the quality of environmental review for each project proposal.

For more information and/or a certificate of permission application package call the Coastal Resources Management Division permitting program at (203) 566-7404, or write the Coastal Resources Management Division, DEP, 18-20 Trinity Street, Hartford, CT 06106.

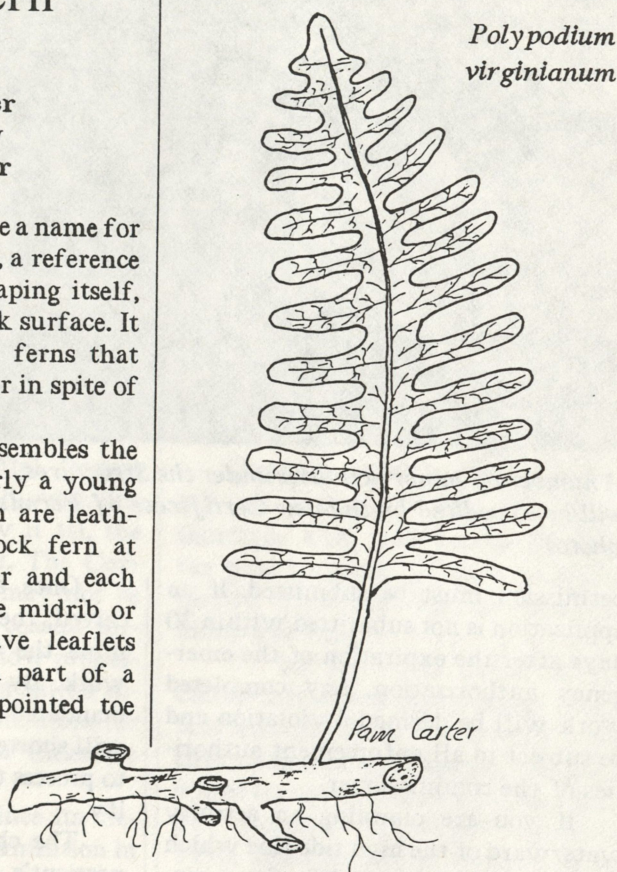
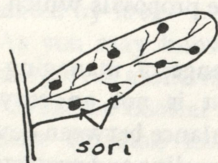
This article was originally prepared for Wavelengths, the newsletter of the Connecticut Marine Trades Association.

Polypody or Rock Fern

by
Gale W. Carter
Illustration by
Pamela Carter

The French Canadians have a name for rock fern.....*tripe de roche*, a reference to its growth habit of draping itself, mat-like, over many a rock surface. It is one of those evergreen ferns that still persist in cold weather in spite of the blasts of winter.

In some respects it resembles the Christmas fern, particularly a young developing specimen. Both are leathery and evergreen, but rock fern at maturity is much smaller and each leaflet is winged near the midrib or axis. Christmas ferns have leaflets that resemble the bottom part of a stocking, complete with pointed toe and heel.



The leaf of rock fern is deeply cut, nearly to the midrib, into 10 to 20 leaflets. Each leaf or frond is up to 12

inches long and two inches wide. On the back of each leaflet, except for a few at the bottom, are a number of round clusters of sori that contain the spore cases. A membrane or indusium for covering these spore cases is lacking in this species. The sori are green-white at first and are golden brown at maturity. The spores are ripe from August to September.

Rock ferns are found growing abundantly at all altitudes on rocky sites but occasionally may be found on fallen logs or on tree trunks.

The genus name Polypodium means "many feet." This refers to the "footprint scars" that are left on the rhizome (underground stem) where dead leaves have become detached.

The common name rock cap or rock polypody characterizes the tendency of this fern to cover large boulders.

Few ferns have had as many medicinal uses associated with them. The list is too long to include more than a few examples. The roots were used as a mild laxative and a tonic for dyspepsia, while the leaves made into a drink were used to cure whooping cough and for expelling parasitic worms.

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An Honorable Man

by **James Murphy**,
Principal Environmental Analyst

Recently the Connecticut environmental community lost a friend, Robert Paier, editor of DEP's monthly publication, *Connecticut Environment*. For many of us, Bob's death is a deep personal loss for he was a valued, intimate friend. We admired him not only for being a skilled and dedicated colleague, but also as a compassionate human being, deeply concerned for people and the quality of their envi-

ronment. Bob was an intensely spiritual man, believing in the sanctity of all life, and in his role as a communicator/teacher, he never passed up an opportunity to call for adoption of a personal conservation ethic.

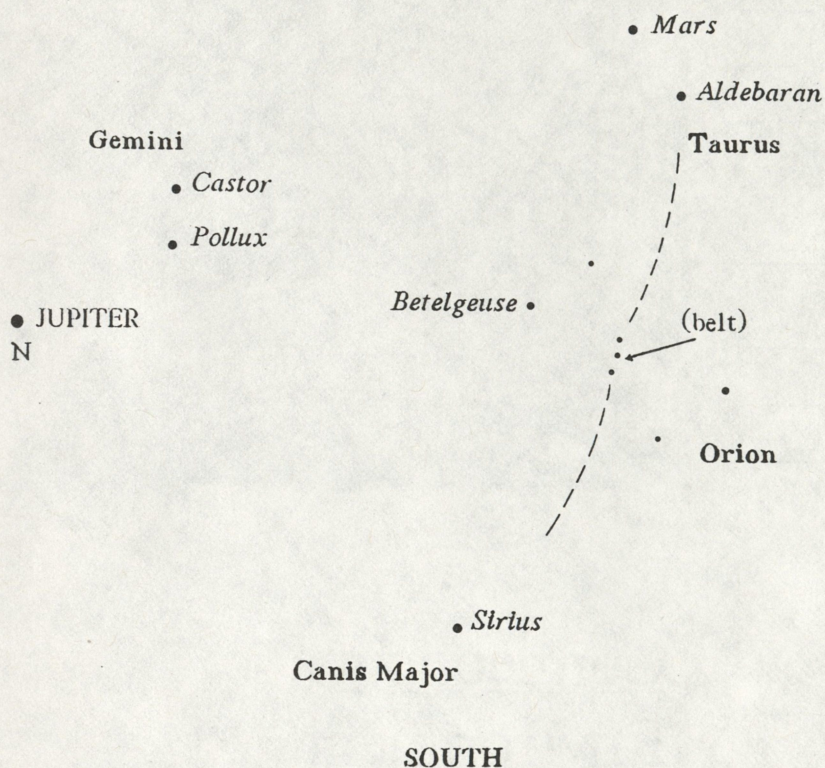
He was a talented and prolific writer and film producer and used these skills to give others an opportunity to voice their personal views on a variety of topics. The many personal interviews he conducted and taped and the articles he wrote are a rich historical sketch of Connecticut's modern conservation movement.

One of his special interests was working with fellow Vietnam veterans. He appreciated their special needs and concerns and, again, using his

skills in service of others, he gave of his time and talent unselfishly. As a legacy to them and us, he coproduced a moving documentary on the personal experiences of ten Connecticut Vietnam veterans. Though this film illuminates a time and place for us, its value and importance is that it also reveals the giving, supportive nature of its author.

All that Bob expected in life was to be treated with respect and, later, to be remembered as an honorable man. He was my friend and I am fortunate to have known him. He made a difference in my life and in the lives of many others. He was an honorable human being and I miss his presence but cherish his spirit.

The Night Sky



time travelling to the right, or west, will lead you to the brilliant red bullseye, Aldebaran, Taurus the Bull's brightest star. Right now, don't be fooled by a second reddish object in Taurus, the planet Mars, which overpowered every other celestial body in November, but is now dimming to the point where it compares in brightness to Aldebaran.

Meanwhile, back to the belt, this time use it as a stepping-stone up to Orion's brighter shoulder star, Betelgeuse, continue on up until you find two nearly identical stars side by side. The one to the left is Pollux, the right, Castor, together the heads of Gemini, the Twins.

Of course at the present time, none of these objects compare to Jupiter. Even without being told how to find it (to the left of Pollux), you'll notice Jupiter; it is and will be the brightest celestial object until early summer, if you can think of summer on nights like these. ■

Endnote

The Winter Sky

by Francine Jackson

Now, who would ever want to be outside on such cold winter evenings? You would, if you knew what beauty awaits you overhead. The winter sky is usually considered the best and most beautiful of the year, and with Mars and Jupiter still glowing brightly, it is truly worth a few minutes of shivering.

Of course, the best part of the winter sky is recognizing the constellation Orion. Looking due south, you can very easily find the three stars in a row marking his belt, and the two bright stars each above and below the belt, respectively his shoulders and his knees. The rightmost star of his belt,

Mintaka, is very useful for navigators. It lies right on the celestial equator, the imaginary line directly between the north and south celestial poles, comparable to our own terrestrial equator.

We can use the belt to navigate our way around the winter sky. Draw a line through the belt, and follow it downward to the brightest star in our nighttime sky, Sirius. Sirius, also known as the Dog Star, belongs to Orion's faithful companion, Canis Major, the Big Dog. Although not the brightest object in the sky, Sirius is often mistaken for airplanes, helicopters, and even, occasionally, a UFO.

Moving back to the belt, but this

"Not so long ago, an elderly Swiss tourist [on the island of Komodo, home of the Komodo dragon] strayed from his group and disappeared; a search party found only his hat, his Hasselblad camera and a bloody shoe. 'He loved nature throughout his life' reads the epitaph on a commemorative white cross. Apparently nature loved him back."

Travel writer Steve Silk
The Hartford Courant

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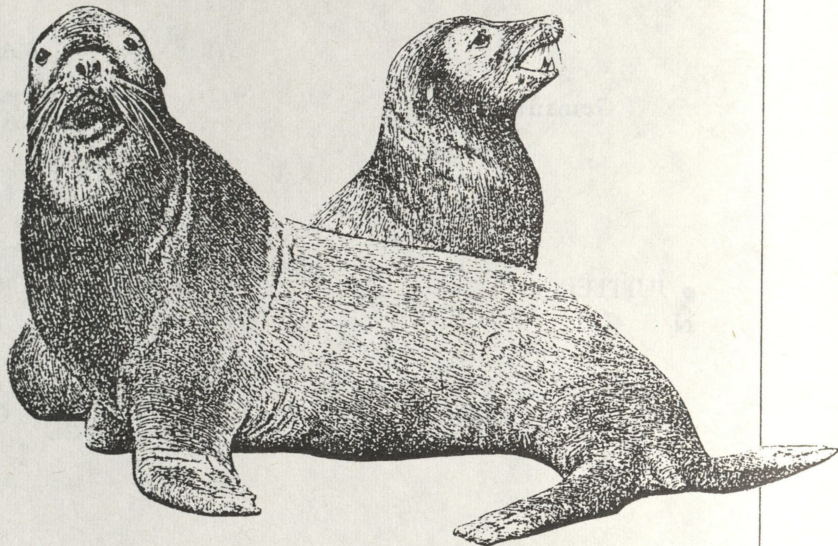
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